

NOTES ON THE MORPHOLOGY AND BIOLOGY OF
HYDNORA AFRICANA Thunb.

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The genus *Hydnora*, which comprises several species (about seven), is confined to Africa, Bourbon, and Madagascar. They are all parasites, which grow on the roots of different shrubs and trees. The species which forms the subject of these notes, viz., *Hydnora africana*, uses the common milkbush of the karroo and karroid regions of the interior as its host, viz., *Euphorbia mauritanica* L.

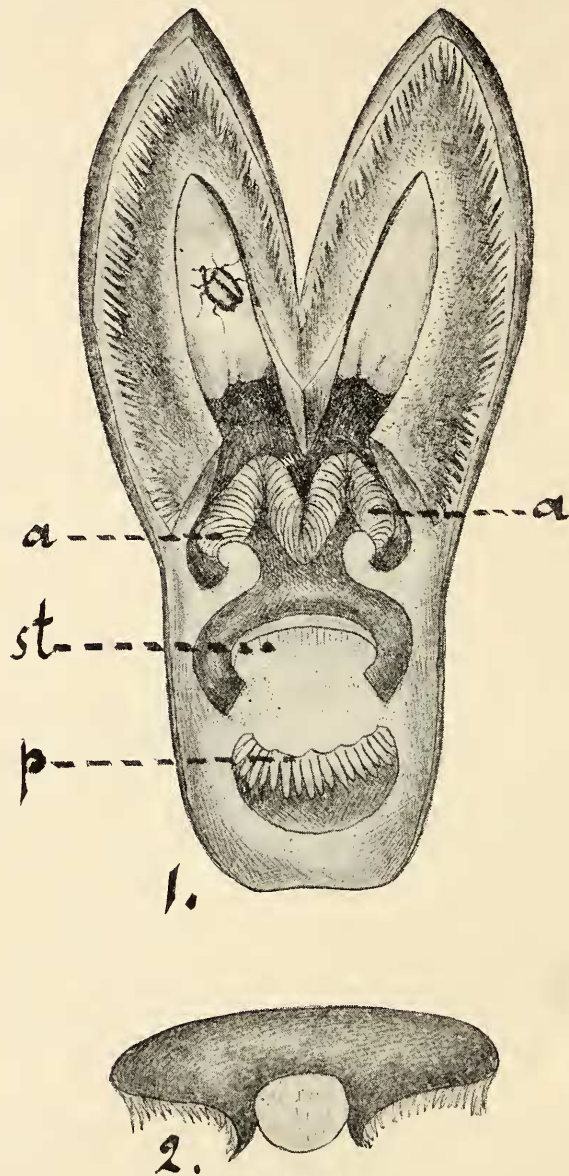
The genus is usually placed in the natural order Rafflesiaceæ, which in its turn is sometimes combined with Cytinaceæ, as, e.g., by Bentham-Hooker. It has been pointed out, however, by Solms-Laubach that the connection, as far as the morphological characters are concerned, is a very weak one, and that it would be better to establish Hydnoraceæ as a separate order. There is only one other plant nearly allied to *Hydnora*, viz., the South American genus *Prosopanche*, which is monotypic, possessing only one species, viz., *Prosopanche Burmeisteri* De Bary. This plant represents one of the few threads which connect the flora of South America with that of South Africa.

There are three species of *Hydnora* known from South Africa, but one only, viz., *H. africana*, is of fairly common occurrence.

The plant consists of an underground angular stem, which is covered with tubercles, but produces no roots, attaching itself to the roots of the host by sending suckers into its tissue. At these spots the *Euphorbia* root swells considerably, and as the free end usually dies, such a root does not feed its own plant any more, but serves merely as a feeding-tube of the parasite, through which the building materials which it requires are drawn from the host.

When the stem of the parasite, which creeps horizontally in the ground, has become sufficiently large and gorged with food materials,

it produces buds, which soon appear above the surface of the ground, and finally open with three slits. It is in the structure of the flower that I have observed something which had hitherto escaped the attention of botanists.



HYDNORA AFRICANA Thunb.

1. Flower cut open, one-third removed.

a, androecium.

st, stigma.

p, placenta.

2. Transverse section through one perianth-lobe with the white body in the centre.

Each of the three segments of the perianth bears a large snow-white body on its inner side, while the remainder of the inner

surface of the flower is of a bright fleshy colour. These three white bodies are not mentioned in any existing description of *Hydnora*, and I think I have found the reason why that is not the case.

When I made this little discovery by opening a large bud of the plant I was so surprised by the difference in appearance and structure that I analysed a portion of this body. While the entire plant is highly impregnated with tannin, containing almost as much as oak bark, this white substance is like a spongy pudding, not only in appearance but also in taste, containing fat and albuminous matter.

It occurred to me at the time that this might serve as an attraction to some animal, which in feeding upon these bodies would effect cross-pollination of the plant, but it was, of course, not possible to guess who the visitor might be. However, some friends of mine, among them Mr. Izaac Meiring at Worcester, sent me some more flowers, each one carefully wrapped up in a piece of cotton, and among them I found several which contained a number of black beetles. These have been identified by Mr. Péringuey as *Dermestes vulpinus*, an insect which is well known to collectors of skins and horns, as the beetle as well as the larva destroys animal specimens if not properly preserved.

As this beetle lives on carrion and other animal matter, it is evidently attracted by the smell of putrefaction which the white substance emits on decaying. The flower is really a trap for these beetles, for the inner side of each segment is lined with a fringe and covered with bristles which point inwards, allowing the beetles to creep in but preventing them from leaving the flower when their meal is finished. In their endeavour to escape they must necessarily crawl over the anthers and stigma, and consequently become covered with the pollen. When at last the flower withers and the bristles shrivel up, the beetles are able to escape and to enter another flower, thereby transporting the pollen from one flower to another and effecting cross-pollination.

As the anthers are situated above the stigma, self-fertilisation would also take place in case no crossing should have been effected.

These observations explain why the white bodies have not been described until now, for in the flowers which reached botanists at home these bodies had either been eaten out by insects or they had decayed during the drying of the juicy plant.

The question arises, which morphological part of the flower has been modified in such a remarkable way? This question I must leave undecided, for these bodies, which possess the function of nectaries, may be modified petals or staminodes or merely append-

ages of the perianth segments. It would be necessary to examine the other species of *Hydnora* in this respect, and it may be necessary to trace their evolution from the youngest stage.

It is often stated that the fruit of this plant, which contains a jelly-like mass, in which the tiny seeds are embedded, is a favourite food of the jackals, and the Colonial name, "jackals kost," has been given to it on that account. Whether that is correct or not I cannot say, but I have found many of the fruits scratched out of the ground in places where no jackals lived. It appears more likely that the unearthing of the fruits is done by the porcupines, for I have seen their burrows among the *Euphorbia* bushes where the *Hydnora* abounded. These animals would eat the contents, jelly and seeds, and in their nightly wanderings disseminate the plant afterwards.

The flowering season of the plant is spring, and the fruit ripens during the summer. If, however, no rains should have fallen at the proper time, the plant does not flower at all.